**Maine Policy Review**

Volume 5 | Issue 2

1996

# Clearcutting in Maine: Would Somebody Please Ask the Right Question?

John M. Hagan III

# Clearcutting in Maine:
# Would Somebody Please Ask the Right Question?

**Maine Policy Review (1996). Volume 5, Number 2**

*In November, Maine citizens will cast their votes for or against the Green Party-initiated referendum on forest practices. Better known as the clearcutting referendum, its supporters and opponents have staked out their terms in what has become a bitter debate over "jobs for Maine people" versus the "future of the North Maine Woods." Yet, amidst the deluge of media campaigns and ideologic predictions, rest important questions--about forest management practices and how best to ensure a viable future for the people and forests of Maine. John Hagan contributes a perspective to this debate. He blends scientific data with personal experience of the North Maine Woods. He wonders: Have we asked enough, or even the right, questions to fully ensure that a "yes" or a "no" vote in November will protect the values we hold for the forests and people of Maine?*

*John M. Hagan III*

**Introduction**

Few images can evoke negative emotion like that of a clearcut. In many ways, clearcuts look like a result of war. While it may be impossible to legislate against war, the same might not be said of clearcutting. The Green Party of Maine has successfully petitioned the state to place a referendum on the November ballot to make clearcutting, and some other forest practices, illegal in the state. The question will be posed ‘Do you want to ban clearcutting and set other new logging standards?’ How could anyone vote to retain a logging practice which produces a landscape that looks like a war zone?

Perhaps the question is not as simple as it seems. By banning clearcutting what specifically do we hope to achieve--what personal values will then be protected that were not protected before? An aesthetically pleasing forest? A productive forest? A safe place for Maine’s native plants and animals? Jobs? The price of your Sunday paper? Which values do you, as an individual, seek to protect? Have you fairly listed all the values you hold for the forest? In this paper I propose that most of us have done a poor job of identifying this set of values. Yet this is a necessary first step in the formation of successful forest policy--policy that fairly balances the benefits of the forest for the long term.

Identifying our values is only the first step, how- ever. The harder work will come as we try to develop strategies that protect those values. When the values are many, and the issues technically complicated (e.g., forestry, economics, and ecosystems), we cannot expect to fairly balance the values with quick-fix answers. Rather, reasonable, thorough, measured analysis will be almost certainly required to have a chance at successful policy formation. The clearcutting referendum

fails on both steps, full value identification and measured analysis. Moreover, it has forced others into making similar errors. It has, however, gotten our attention.

**A Personal Perspective**

In 1991 I had my first introduction to a clearcut. In response to an international concern for declining migratory bird populations, I approached three paper companies in Maine about studying what role industrial forestry might be playing in the decline of these species. Nearly 80 percent of Maine's breeding birds are migratory. I suggested to the companies that having data would be better than not having data. If there was a problem with forestry and migratory bird populations, with data we might actually have a chance of coming up with a solution. Without data, any action we might take could make things worse. Great Northern Paper, S. D. Warren, and Champion International all agreed to make their timberlands available for study, even though they would have no control over the data, the interpretation, or the dissemination of the results.

In July, 1991, an S. D. Warren forester took me to a township north of Greenville for an introduction to the landscape in which I would begin research in 1992. Why he chose a clearcut as the welcome mat I may never know, but I feel sure he had his reasons. He seemed immune to the appalling sight of it all, whereas I was rendered incapable of simple conversation. In the middle of this clearcut my sense of sight was assaulted. I could not concentrate on what the forester was saying. Oddly, though, the stumps of recently cut balsam fir filled the air with the smell of Christmas and happy times. The incongruity of these sensory signals was overwhelming. Then and there I realized how powerful, and paradoxical, a clearcut could be. It was only the beginning.

After this formal introduction to the industrial forest I developed research plans for the next three years. There would be no need to survey the clearcuts, I concluded, because nothing could live in what I had seen, at least for many years. Although I had free rein to design the research, a woodlands manager asked if I would be willing to survey sites in clearcuts as well. He astutely reminded me of the premise that having data was better than the converse, the argument that I had used so effectively on the three companies earlier. I conceded, which seemed only fair given the cooperation I was getting. Besides, once I had documented that clearcuts were avian deserts, public pressure might bring about kinder, gentler, forest practices.

Less than a month into my first field season in 1992, my field crew and I realized that clearcuts, and the scrubby even-aged regeneration that followed, were full of birds. Many of the species that used these habitats were species of conservation concern (e.g., Chestnut-sided Warbler, Common Yellowthroat, American Kestrel, Lincoln's Sparrow, Mourning Warbler, and the list goes on [Hagan et al., 1995]). Clearcuts were not the biological deserts I had thought. My own data demanded that I confront my preconceptions. It was a lesson most scientists learn at one point or another. Indeed, this is what makes science so interesting--it allows us to see around corners that otherwise obstruct our casual, day-to-day assessment of the way things seem to be.

But the news was not all favorable. While clearcuts were not biological deserts, they are created at the expense of mature forest habitat. Another whole set of bird species uses mature forest, many of which are of national conservation concern as well. This was the second manifestation of the clearcut paradox. Depending on the species, clearcuts could be either "good" or "bad."

**The "Trajectory" of the Forest"**

Despite general public belief to the contrary, I learned that clearcuts could grow back into mature forest. But a key ecological question for me became how much mature forest would there be in the future, and how much would be needed to support self-sustaining populations of Maine's native plant and animal species. What confused me, at first, was why 50 to 60 percent of our 700 square mile study area was covered in 60 to 100 year-old forest. At harvest rates of around 1.5 percent per year, which currently is representative of the paper-making forest, simple math shows that only about 10 percent of the landscape should be in forest older than 60 years of age (Figure 1). The only explanation for this discrepancy between the amount of mature forest actually observed, and the amount that should be observed, was that harvest rates had not been stable over time, but had increased. The forest we see today was "produced" at a time when the annual harvest rate was much lower. To extend this logic, the forest we will see 20 to 30 years from now will be different from the forest we see today. There will be less mature forest and more young forest. Assuming annual harvest rates of 1.5 percent per year are maintained (which is consistent with a 60- or 70-year harvest rotation period), the forest eventually would settle into a new age-class distribution (notwithstanding natural or unintentional human disturbances).

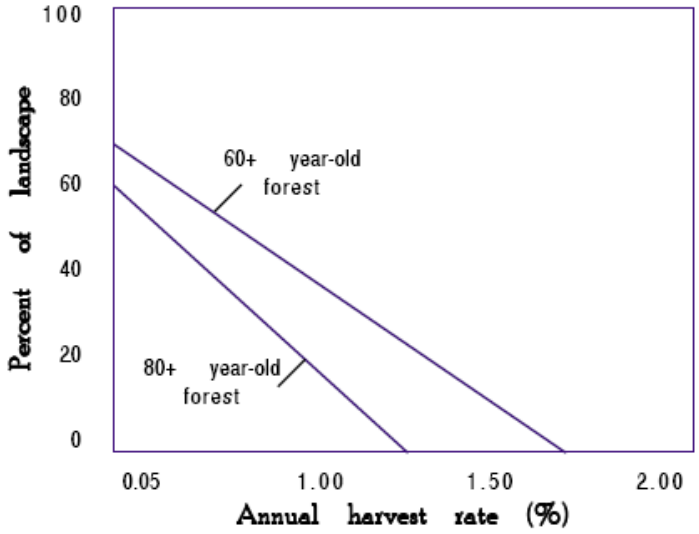



**Figure 1.** The percent of the landscape covered by 60+ year-old forest and 80+ year-old forest in relation to annual harvest rate. This figure is hypothetical, and does not account for areas that might be excluded from harvesting as a result of voluntary or regulated set-asides. It serves simply as a reference chart.

Roughly speaking, to maintain a constant and steady annual supply of pulpwood, at any given time one-seventh of the forest would be 0 to 10 years old, one-seventh would be 10 to 20 years old, one-seventh would be 20 to 30 years old, etc. Nature would be unlikely to let the forest maintain such long-term "neatness" in age-class distribution, but new technology in the paper mills and new technology in silviculture, especially in the last 20 years, has contributed to

launching this new forest "trajectory." From a strictly "growth and yield" point of view for pulpwood, such a strategy may well provide for a sustained flow of fiber for the long-term. It will not, however, maintain the forest we see today on Maine's landscape. This trajectory, which many people recognize as clearcutting, herbicide spraying, plantation forestry, and the like, is viewed with some caution, because it is unclear exactly what the future forest will look like, what other values might be compromised along the way, and what benefits in terms of wood flow and Maine's economy might be realized.

**Clearcut Defined**

In Maine, "clearcut" is precisely defined as harvests greater than five acres in area and that leave less than 30 square feet of basal area of residual trees per acre (Basal area is defined as the area of the cross-section of a tree at 4.5 feet above the ground--38 trees, 12 inches in diameter, have a cumulative basal area of 30 square feet.) This is an arbitrary definition, but nevertheless useful for forest policy and record keeping. Though a categorical construct of convenience, a clearcut represents only one end of a continuum of harvest strategies, a very light selection cut being at the other end. In between, there are all kinds of harvesting strategies, including diameter limit cuts and single- or multi-stage shelterwoods, which also would be rendered illegal by the clearcutting referendum (see sidebar).

However, all harvests that leave less than 30 square feet of basal area per acre, though technically defined as clearcuts, are not economically or ecologically equal and should not be lumped together. Clearcutting is a "tool" that can be used to liquidate a stand, with no concern for the future stand, future generations, or Maine's flora and fauna. Clearcutting is also a tool that can be used to harvest existing trees and to enhance growth of already-established seedlings and saplings. Foresters call this an "overstory removal," but by law, it's a clearcut if the young regenerating trees are less than five feet tall. Clearcutting also might be used to prepare a site for a plantation of a fast growing native or exotic tree species. Like any tool, when used by an irresponsible or uninformed user, the results can be disastrous.

Ecologically, clearcuts that remove most or all of the woody debris, such as branches and tree tops, from a site, are undesirable. Though some bird species will use even "clean" clearcuts, more species will use "messy" ones that have slash scattered about. Such structure provides nesting sites and safe places from predators. This debris may also enhance the ability of temperature and moisture sensitive amphibians to survive the habitat change.

At least one major problem all clearcuts have, especially messy ones, is that they are ugly. Clearcuts therefore appear to represent irresponsible, greedy human behavior. They look as if the perpetrators had no concern for the future. Leaving slash and coarse woody debris scattered about the clearcut only makes the scene worse--another ecological paradox. This demonstrates that aesthetics and ecology are not always correlated in a positive way; if we assume that plants and animals benefit only from what humans like to look at, we run a great risk of wrong-minded, counterproductive forest policy.

## Clearcutting as a "Tool"

Most foresters and paper companies that engage in clearcutting today consider carefully the forest that will be there in the year 2040 or 2060. Depending on the forest product produced, clearcutting can be an important forestry tool to achieve century-scale objectives. Even when ownership of large tracts of forest in Maine changes corporate hands, the woodlands manager and foresters on the ground generally stay the same, many of whom are long-time or native Mainers. Even so, clearcuts face an uphill battle for public acceptance. To suggest that clearcuts can make long-term silvicultural sense, or that they are used by many bird species of conservation concern, is like asking the public not to believe their eyes. Iron-clad proof must be provided. The problem is that the industry cannot provide this proof itself because of the conflict in interest. Such information must come from an independent, unbiased source.

Of course, the practice of clearcutting cannot be defended simply by the fact that clearcuts are used by many bird species. My own studies have not addressed how clearcuts are used by other plant and animal species, or whether clearcuts make long-term silvicultural and economic sense. Many questions need to be answered about clearcuts--about long-term nutrient loss, about how clearcuts change species composition (and whether that is significant), about erosion, about fiber production (is it enhanced or diminished), about the implications to Maine's native flora and fauna. As I learned with birds, though, it is unwise to assume what the answers will be.

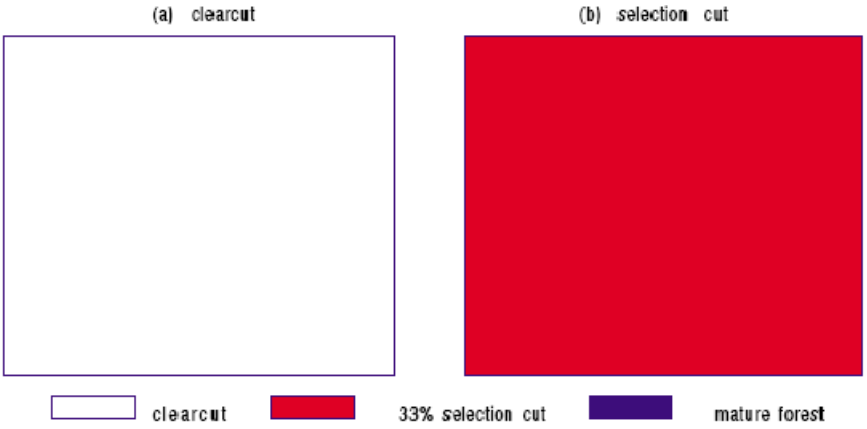
Rather than doing the work required to get the answers to these and other valid questions, one alternative is to simply make them moot by banning clearcutting. What new questions, then, would take the place of current ones?

The relevance of questions about clearcutting may have been waning, even before the referendum appeared on the scene. Data from the Maine Forest Service shows that between 1989 and 1994, clearcutting has decreased from 45 percent to 11 percent of the annual harvested acres (J. Blanck, personal communications). Assuming an equal volume of wood is harvested each year in Maine, the total number of harvested acres must increase as the number of clearcutting acres decreases. For example, one might go about gathering 2500 cords of wood either as a 100-acre clearcut, or as a 300-acre partial cut where only one-third of the trees are harvested at a time (Figure 2). This simple inference is supported by the Maine Forest Service data: between 1989 and 1994 the number of partial-cut acres of forest increased (from 55 percent to 89 percent) as the total number of clearcut acres decreased (Figure 3). The total number of clearcut and partial cut acres harvested increased from 326,000 acres to 504,000 acres, reflecting the fact that more acres must be harvested under a partial-cutting strategy to meet specific wood volume demands.

## Mimicking Nature

It seems to be widely assumed that this reduction in clearcutting is good for Maine's forestlands. It may, in fact, be good. But when placed in the context of the public's demand for wood and paper, it may be that alternatives to clearcutting are just as worrisome.

Figure 2. Harvesting strategy (equal wood volume)




A comparison of two landscapes in which an equal volume of wood has been harvested by (a) clearcutting, and (b) a 33% selection cut. The selection cut requires 3 times as much harvest area as the clearcut, and leaves no closed-canopy forest in the landscape. In addition, roads must be kept open in the selection cut strategy to re-access the forest every 15 to 20 years. There will be many stand-level and landscape-level differences in the two areas--the ecological costs and benefits of which are not well understood. Given the poor state of ecological knowledge, employing either strategy alone may increase ecological risk.

Timber harvesting that best mimics nature is broadly considered by both scientists and the public as good. Selection cutting often is extolled as a better representation of nature because it results in a forest with many ages and size classes of trees (an uneven-aged forest), which nature often produces. However, nature also produces even-aged forest through fire, windthrow, and budworm epidemics. Thus, both harvesting methods can result in a forest similar to that produced by nature.

However, both selection-cutting and clearcutting have trouble replicating nature, for many reasons. First, both methods remove wood from the forest, whereas it is left on site with natural events. Clearcutting results in an even-aged, closed-canopy stand, but typically the stand will not be allowed to reach ecological maturity (in Maine, 100 to 200 years of age, depending on the tree species composition and chance natural events). Rather, with clearcutting, silvicultural maturity comes when the stand is roughly 60 years old, at which time it will be cut once again.

In contrast, a selection-cutting strategy generally involves harvesting 20 to 30 percent of the trees in a stand every 15 or 20 years. This strategy leads to a more open-canopy forest with fewer trees than naturally would be present at any single point in time, but trees are allowed to grow longer toward biological maturity. This practice does not mimic mature, closed-canopy forest, which is by far what nature would offer up across Maine's Northern Forest if given the chance (Lorimer, 1977). Clearcutting mimics nature in some ways, selection cutting in other ways. How Maine's native plant and animal species respond to these different management strategies, over the long term, is not well understood.

The question of whether clearcutting or selection cutting best mimics nature is confounded by the fact that nature is random, chaotic, and highly unpredictable with respect to the death of any particular tree in the forest. Humans, by contrast, require a very predictable and constant supply of wood from the forest each year. The supply must be spatially predictable as well, because landowners are constrained by ownership boundaries. We cannot, therefore, mimic the once-in-

a-millennium 100,000-acre fire. We can mimic nature at the stand level, either with clearcutting or with selection cutting, but we have a lot of trouble mimicking nature at the landscape level (e.g., the township scale [25,000 acres] or greater) because of our constant demand for wood.

**What is the Debate Really About?**

With clearcutting on the wane, and maybe soon banned, a whole new set of questions will surface. For example, if a greater proportion of Maine's forest is to be subjected to partial cutting, what will the consequences be for Maine's native flora and fauna, especially those species that do best in mature, closed-canopy forest? The clearcutting referendum allows only one-third of the basal area to be removed from a stand in any 15-year period, and the basal area cannot fall below roughly two-thirds of a fully stocked mature stand (see sidebar). It is quite possible that forest landowners, abiding by the letter of the referendum, would produce an enormous amount of frequently disturbed forest in Maine. Mature, closed-canopy forest would become quite rare. New, permanent roads would be built to access the forest, and the forest will be entered every 15 years or so with heavy equipment. Is this what the public wants? It is likely what the public will get if the referendum passes. Is the important question here really about a particular forest practice? Or, is it something else entirely? If it is something else, we should face it head-on and not be distracted by clearcutting, which may turn out to be largely irrelevant. What is the debate really about? What is the real question?

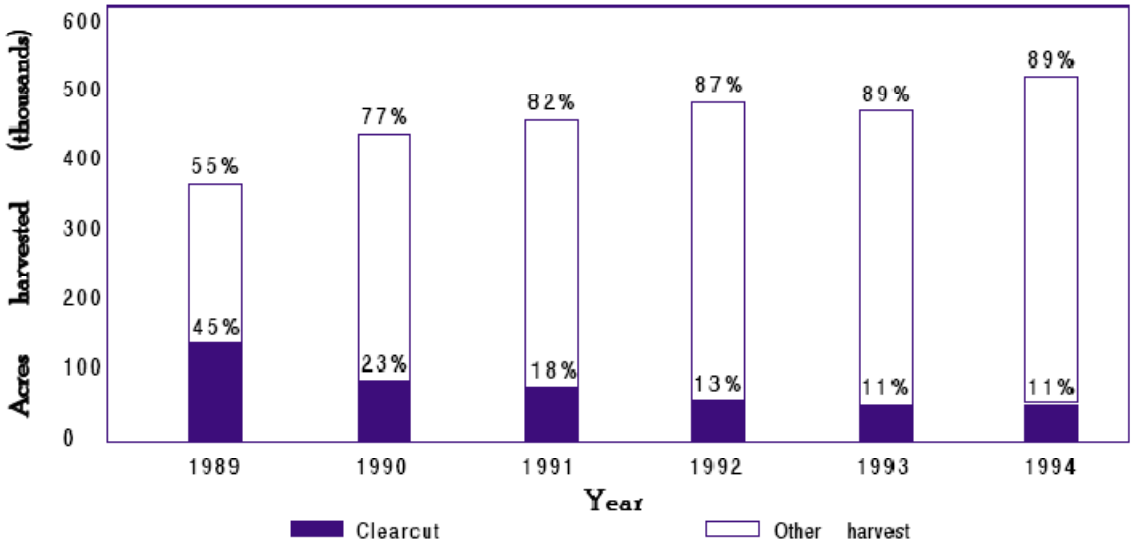



**Figure 3.** Number of acres of clearcut and partial cut forest in the unorganized townships of Maine between 1989 and 1994. The percent of total harvested acres is indicated above each bar. Notice that as the number of clearcut acres decreases, the total number of acres harvested increases.

The polarity in current societal discourse comes largely from different values people place on the forest. Human conflict about natural resources, or any issue for that matter, is precipitated by a threat to someone's values. In the present example, members of the Green Party and much of the public feel that their values may be threatened by the practice of clearcutting. For example, they may feel that clearcutting threatens certain plant and animal species, the existence of mature forest, or long-term productivity of Maine's forestland. Threats like these, whether real or perceived, often are manifested as contentious debate when we have no way to accurately assess

the threat. We assume the threat is real and react with as much energy as is possible. Such a situation creates a positive feedback in posturing and polarization, which in turn causes inefficiency in finding solutions that fairly protect the values of everyone. In light of factual information, it may become apparent that the threat was not real, and we can spend our energy on more important things. Or, we may find that the threat was real, and that it is time to batten down the hatches. Either way, with factual information about the perceived threat, we all have a better chance of formulating successful public policy because we can better assess the true degree of threat to our values.

The problem with the current debate about clearcutting is that banning clearcutting has become the strategy to avert a threat to as yet poorly defined values. Does clearcutting threaten a particular value that widespread partial cutting protects? What specific values do clearcuts threaten? We are dancing around the real question as if we fear we might actually find an answer.

What is sorely lacking is an articulation of specific public values. Once specific values have been laid out we can set goals and strategies to maintain them. Such strategies may or may not include clearcutting--we cannot know until we clearly define the values we are seeking to preserve.

However, all the values must be on the table. With the full array lined up before us, we can get on with the business of finding out which, if any, of those values are truly threatened. If some are threatened, we can develop a strategy for reducing the threat. Moreover, with the full set laid before us, it becomes possible to see how decreasing the threat to one value might increase the threat to another, or, how two ostensibly incompatible values might in fact be complementary. If only some of the values are laid out we run a high risk of being hypocrites (e.g., insisting we reduce the timber harvest rate in Maine while continuing to buy the Sunday paper and magazines, and feeding reams of paper into our laser printers and copying machines, all of which usually takes place in a setting constructed, to a greater or lesser degree, of wood). Each of us will want to balance the benefits in a slightly different way, but each of us must see, understand, and acknowledge our own full set of values, as well as the superset laid out by society. If all the values are laid out, and we are able to gain some unbiased evaluation of the threat to each value, then we can develop a measured strategy to protect them.

This point warrants a digression in discussion. A clearcut is technically defined as less than 30 square feet of tree basal area per acre. How many of us have less than 30 square feet of basal area per acre on the patch of land we call "home?" (a yard stick will do in a pinch, and remember the formula pr2 ). Why is it o.k. to clearcut (technically speaking) a patch of land for our dwelling, but not o.k. to clearcut a patch to get the wood to make our home, or to make the Sunday newspaper? A clearcut will turn back into forest, and provide a successional cascade of habitat over time for all kinds of plants and animals. For many of us, the patch of land we call home will not yield such benefits in the next half century, or maybe ever. That patch of land does, however, yield a very, very important benefit to us -- maybe the benefit we value more than any other, one that we would certainly sign a referendum petition to protect--a dry roof and a warm place to live. This is an example of what happens when all the values are laid on the table. Once each of us understands our own full set of values, we can then bring them to society as a whole with greater integrity.

The need for a process to identify values is enormously complicated by at least two additional factors. First, the collective values of society represent a moving target. How the public might want to balance the benefits of Maine's forest has changed and will continue to do so. The forest products industry may as well resign itself to periodic adjustments in forest policy.

Second, the global human population will continue to increase for the foreseeable future. Despite expected increases in recycling, the demand for wood and paper is likely to track human population growth. Even now, nearly one-third of all the raw material humans use is wood (excluding agriculture) (Williams, 1989). Since no state or nation the size of Maine has achieved total self sufficiency, Maine can figure on supplying part of a global demand for forest products, just as it can figure on consuming a part of the world's oil and orange juice. The environmental community may as well resign itself to this fact.

The environmental community, the forest products industry, and the full newspaper-subscribing, outdoor-loving, highest-standard-of-living-in-the-world-and- wanting-more public, all have a responsibility to protect the full array of values society has for the forest. As best we can, we must protect those values for future generations as well. It is unclear at present how long such values might be fairly balanced before one is bobbled and dropped, because we have not taken the time to do the hard work we need to do in understanding how these values relate to one another (e.g., affordable paper and healthy wildlife populations).

Whatever one might think of the clearcutting referendum, it has served the purpose of suggesting that it is time for better data and more dialogue about whether the public's values are being protected. Unfortunately, the referendum does not provide an appropriate mechanism for this. To the contrary, it is forcing the people of Maine to come to some decision on this rather significant and complicated question by November. It has precipitated a flurry of up-front and behind-the-scenes efforts to craft alternatives, all of which suffer from the same shortcomings of the referendum--limited deliberate analysis of whether our ecological, economic, and recreational values will be more or less well protected by the actions we take. Is there some social law that says this is how things have to be--that we are prohibited from carrying out thoughtful analysis over a reasonable time period to help formulate policy?

For example, one of the alternatives to the referendum, and perhaps advanced publicly by the time of this publication, allows clearcuts but promotes widely dispersing them across the landscape. This is considered by some to be desirable in the pursuit of a not-very-well-articulated goal. It is well documented in the scientific literature (Franklin and Forman, 1987, Li et al., 1993) that widely dispersing clearcuts accelerates the rate of forest fragmentation. Next to habitat loss, habitat fragmentation is conservation biology's most studied problem. A simple diagram demonstrates that such a strategy limits the amount of continuous forest on the landscape (Figure 4, dispersed strategy). In the first year of harvesting, clearcuts are tucked away here and there, and have little influence on the rest of the landscape. But if harvesting is allowed to continue through time (which is reality), there is no section of the landscape represented by forest that is free from the influence of nearby new disturbance. A pattern emerges over time that could actually jeopardize the ecological qualities the policy was intended to protect, a pattern that could take decades to "erase" from the landscape. If having some larger tracts of continuous forest in the landscape is a goal, then tightly clustering clearcuts, or even making fewer, larger

clearcuts, may better meet that particular goal (Figure 4). Such a course of action might conflict with other values, however, which again demonstrates the need to have all the values lined up before policy is created.

I discussed this logic of landscape geometry recently with someone involved in drafting one of the alternatives to the referendum. He understood the concept completely. But he said it was virtually irrelevant to the situation at hand, which amounted to a great urgency in getting an alternative, ANY alternative, to the referendum, while there was a window of opportunity. We would simply have to "fix" later any policy mistakes we might make.

There has to be a more intelligent way than this for our society to move forward with forest policy, or any policy. The Northern Forest Lands Council (NFLC), which was formed by Congress and the governors of the four Northern Forest states in 1990, had as its mission to find ways to reinforce traditional patterns of land use in the region. The Council's work represented one strategy to identify the public's values. The Council disbanded in 1994, as planned, but it produced a template and springboard for problem-solving (NFLC, 1994). There are a few shining examples of having taken the work of the Council seriously, perhaps most notably the little-known (in the public's eye) Maine Forest Biodiversity Project, which formed in 1994 in near-perfect synchrony with the "sunset" of the Northern Forest Lands Council. It brought together people with an ecological, silvicultural, and economic understanding of Maine's forest. The group of roughly 100 set about to find, through careful analysis and thoughtful discussion, and by drawing on the large and diverse pool of knowledge present, a strategy for protecting both Maine's native flora and fauna as well as Maine's forest products industry. The progress of the group has been slow but steady. Foresters with different companies are working with ecologists to identify key ecological features of the forest that should be maintained and protected. The group, together, is focusing on solutions that can be applied on the ground. It represents a logical, measured approach to problem solving. It represents a place to which new scientific information can be delivered and incorporated into the problem solving process. It serves as a clearinghouse for the best available information. Unfortunately, the importance of this project, and the process it represents, is eclipsed by the quick-fix, impatient, self-imposed urgency of the referendum or any number of equally abrupt alternatives. Moreover, I am not sure most of the participants in the Maine Forest Biodiversity Project yet fully recognize the importance of the work they are trying to do. What is worse is that many of the founders and participants have had their valuable time and energy siphoned off by the referendum debate.

**Conclusion**

Consider the question: "Do you want to ban clearcutting and impose new forestry standards in Maine?" Is there anything you might like to know before you cast your vote? Would jobs be lost, and if so, how many? What would be the ecological benefits of banning clearcutting? Could there be unanticipated ecological costs associated with banning clearcutting? What would happen to the price of paper and lumber? If the referendum constrains the flow of wood from Maine, what other state, or country, will make up for the shortfall? Will any ecological gains that might be achieved in Maine translate into ecological losses elsewhere (say, where Maine's migratory birds spend their winter)?

The question we should be asking is "what do we want from Maine's forest?" If we can be specific in answering that question, and if the forest products industry, the Green Party, and all the rest of us behave responsibly and contribute our skills constructively, we will fairly achieve our goals. Now would be a good time to find a new public process for conserving natural resources.

**Initiated bill to promote forest rehabilitation and eliminate clearcutting**

Be it enacted by the People of the State of Maine as follows:

Sec. I. 12 MRSA Sec 682, subsection 5-A, 5-B, and 5-C are enacted to read:

5-A. Basal Area. "Basal area" means the cross- sectional area of the stem of a tree measured at 4.5 feet above the ground outside the bark.

5-B. Clearcutting. "Clearcutting" means any timber harvested on a forested site which results in an average residual basal area of all trees greater than 4.5 inches in diameter at 4.5 feet above the ground totaling less than 30 square feet per acre, except when the conditions of section 685-A. subsection 12. paragraph C are met.

5-C. Commercial Species. "Commercial species" means commercial hardwood species or commercial softwood species native to the state of Maine and which now, or prospectively as they grow, will contain at least one 12-foot or two noncontiguous 8-foot or longer sawlogs.

Sec. 2. 12 MRSA Sec 682, subsection 7-A is enacted to read:

7-A. Hardwood stand. "Hardwood stand" means a forest stand in which the basal area of all trees greater than 4.5 inches in diameter at 4.5 feet above the ground before harvest is composed of 75% or more of commercial hardwood species, singly or in combination.

Sec 3. 12 MRSA Sec 682, subsection 8-B is enacted to read:

8-B. Mixed wood stand. "Mixed wood stand" means a forest stand in which the basal area of all trees greater than 4.5 inches in diameter at 4.5 feet above the ground before harvest is composed of between 25% and 75% of commercial hardwood species, singly or in combination.

Sec 4. 12 MRSA Sec 682, subsections 12-A and 12-B are enacted to read:

12-A. Softwood stand. "Softwood stand" means a forest stand in which the basal area of all trees greater than 4.5 inches in diameter at 4.5 feet above the ground before harvest is composed of 75% or more of commercial softwood species, singly or in combination.

12-B. Slash. "Slash" means bark, branches, tops, chunks, cull logs, uprooted stumps and broken or uprooted trees and shrubs left on the ground as a result of a timber harvesting operation.

Sec. 5. 12 MRSA Sec 682, subsection 13-A is enacted to read:

13-A. Stand. "Stand" means a forest area forming a silvicultural or management entity containing trees that are sufficiently uniform in species composition, structure, size or age class, spatial arrangement or condition to be distinguishable from an adjacent land area of different character, with inclusions of minor areas with different characteristics that are less than 5 acres in size.

Sec. 6. 12 MRSA Sec 685-A, subsection 12 is enacted to read:

12. Forest management standards. Notwithstanding subsection 5 or any other provision of state law to the contrary, all timber harvesting activities within the commission's jurisdiction must comply with the following minimum standards.

A. Clearcutting is prohibited.

B. In a 15-year period, timber harvesting operations may not result in the removal of more than 1/3 of the volume on any acre, on a basal area basis, of trees of commercial species greater than 4.5 inches in diameter at 4.5 feet above the ground.

C. Following a timber harvesting operation, the postharvest stand of trees of commercial species must meet residual basal area requirements using one of the following alternative methods.

(1) Considering trees greater than 4.5 inches in diameter at 4.5 feet above ground, the residual basal area of the postharvest stand must meet the following minimum requirements.

(a) Sixty-five or more square feet residual basal area per acre where the preharvest stand was a hardwood stand;

(b) Seventy-five or more square feet residual basal area per acre where the preharvest stand was a mixed wood stand; or

(c) Ninety or more square feet residual basal area per acre where the preharvest stand was a softwood stand.

(2) Considering trees greater than 1 inch in diameter at 4.5 feet above the ground, the residual basal area of the postharvest stand must be calculated using the following formula.

S + T = R

In this formula, S is the average number of trees of commercial species per acre in the postharvest stand 1 inch to 4.5 inches in diameter at 4.5 feet above the ground as a percentage of 1000 trees per acre. T is the average residual basal area for trees of commercial species greater than 4.5 inches in diameter at 4.5 feet above the ground as a percentage of the minimum residual basal area requirements for the postharvest stand listed in subparagraph (1) for hardwood, mixed wood, or softwood stands: and R must equal 100% or more.

D. After a timber harvesting operation is completed, a healthy, well-distributed stand of trees must remain, with minimal damage to individual trees. The diversity of tree species, tree sizes, and tree age classes of the standing trees in the remaining stand must be maintained to the maximum extent possible.

E. Timber harvesting operations may not create single openings in the forest canopy greater than 1/2 acre in size, except for land management roads and other roads.

F. All trees harvested must be delimbed at or near the cutting site. Slash must be left in the woods. Slash that is larger than 3 inches in diameter must be disposed of so that no part of the slash extends more than 4 feet above the ground.

The commission may impose, by rule or by permit condition, more stringent requirements for timber harvesting in protection and development districts. The minimum requirements set forth in this subsection may be exceeded upon issuance of a variance by the commission upon a showing of undue hardship and otherwise pursuant to criteria set forth in subsection 10.

Sec. 7. Effective Date. This act takes effect on April 1, in the year following passage.

**Summary**

This initiated bill sets standards for timber harvesting activities within the jurisdiction of the Maine Land Use Regulation Commission. These standards include the elimination of clearcutting, limits on the amount of timber that may be harvested in a specified period of time, and minimum tree stand volume following harvesting operations.

*John M. Hagan is a senior ecologist and director of Conservation Forestry at Manomet Observatory in Manomet, Massachusetts. He has studied the effects of industrial forestry on birds and forest structure in Maine since 1992.*

**Acknowledgments**

I thank Steve Ballard, Kathy Hunt, Malcolm Hunter, Roger Milliken, and two anonymous reviewers for greatly improving an earlier draft of this manuscript. I also thank Carl Haag, Jacqueline Hagan, Jacqueline O'Conner, and William Riegel for helpful discussion and comment on this complicated issue. Though I had much help with this article, I alone am responsible for any errors that remain.

**References:**

Hagan, J. M., P. S. McKinley, A. L. Meehan, and S. L. Grove. 1995. Avian abundance and diversity in a northeastern industrial forest landscape. NCASI Tech. Bull. 705. Research Triangle Park, North Carolina.

Franklin, J. F. and R. T. T. Forman. 1987. "Creating landscape pattern by forest cutting: Ecological consequences and principles." Landscape Ecology. 1:5-18.

Li, H., J. F. Franklin, F. J. Swanson, and T. A. Spies. 1993. "Developing alternative forest cutting patterns: A simulation approach." Landscape Ecology. 8:63-75.

Lorimer, C. G. 1977. "The pre-settlement forest and natural disturbance cycle of northeastern Maine." Ecology. 58:139-148.

Northern Forest Lands Council. 1994. Finding common ground: Conserving the Northern Forest. Maine Department of Conservation, Augusta, Maine.

Williams, M. 1989. Americans and their forests. Cambridge Univ. Press: New York.

**Full cite:** Hagan, John. 1996. ***Clearcutting in Maine: Would somebody please ask the right question?*** Vol. 5(2): 7-19.